



FRD ACTIVITIES REPORT

April - June 2015



RESEARCH PROGRAMS

Project Sagebrush

The comprehensive data report (future NOAA technical memorandum) for Phase 1 of Project Sagebrush (PSB1) has passed review by ARL and all coauthors. Final revisions and editing that take into account reviewer comments are in progress and it should be published early in the 4th quarter. It will provide a detailed description covering all aspects of experimental design, instrumentation, measurements, quality control procedures, and the final database for the project.

Based on internal FRD review, the manuscript 'Revisiting the values of the horizontal plume spread parameters σ_θ and σ_y ' has been revised again and is presently in follow up internal review. It covers some of the key findings of PSB1. A second paper 'An investigation into the magnitude and variation in the standard deviation of horizontal wind direction σ_θ ' is in internal FRD review and revision. Some of the discrepancies observed between PSB1 and some historical data are examined by comparing σ_θ at numerous field sites by time of day and season. Tentatively, it has been found that the magnitudes of σ_y measured during PSB1 tend to be larger than those determined from earlier field studies and that the magnitudes of nighttime σ_θ are much larger than those presently utilized in many existing modeling schemes. A third manuscript 'Empirical method for the estimation of the horizontal plume spread parameter σ_y based on results from Project Sagebrush Phase One' proposes a possible alternative for the determination of σ_y . It also addresses possible reasons for some of the discrepancies observed between PSB1 and historical studies. It is also in internal FRD review.

Bruce Hicks is still working on his analysis of the measurements gathered by FRD and WSU on the Grid 3 tall tower over the period of September, 2013 to November, 2014. The analyses also utilize complementary measurements from the INL mesonet including measurements from the radar wind profiler and sodar. The focus of his effort has been on the parameterization of nighttime turbulence in the stable boundary layer. He reports achieving some insights into the nature of nighttime turbulence. FRD continues to provide him with ongoing updated data sets from the Grid 3 tall tower and mesonet as they become available. (Dennis.Finn@noaa.gov, Rick Eckman and staff)

A draft manuscript entitled "How Should Sample Statistics be Defined for the Wind Direction?" is nearing completion. It looks at the rather *ad hoc* ways sample statistics have often been defined for the wind direction to make it behave like a linear variable with a normal distribution. Alternative sample statistics are suggested based on statistical models more relevant for directional variables. (Richard.Eckman@noaa.gov)

Birch Creek Valley Wind Flow Study

The U.S. Forest Service Fire Sciences Laboratory (FSL) has provided us with their preliminary database of field measurements from the Birch Creek Valley in 2013. However, a final QC reviewed database is still pending. Preliminary investigations depending mainly on FRD measurements have been pursued but a full research effort and merging of FSL and FRD datasets into an integrated analysis awaits the final QC review.

Journal reviews from Agricultural and Forest Meteorology have been received for the manuscript 'Impacts of soil heat flux calculation methods on the surface energy balance closure' by Eric Russell, Heping Liu, Zhongming Gao, Dennis Finn, and Brian Lamb. The lead authors are presently working on revisions and responses to comments. This paper stems from measurements made by Washington State University during the 2013 collaborative field program. (Dennis.Finn@noaa.gov)

Wind Forecast Improvement Project (WFIP2)

FRD has been planning to hire a postdoctoral associate to work on the WFIP2 project. During the quarter, the position was advertised through an existing ARL contract with Earth Resources Technology, Inc. Late in June, Matthew Brewer from the University of Washington accepted an offer for the position. Matthew is currently finishing up his Ph.D. His graduate research involved extensive use of the Weather Research and Forecasting (WRF) model. Some of this work involved simulating diurnal circulations over the same region in Oregon and Washington that is the focus of WFIP2. The start date for the position is the last week in August. (Kirk.Clawson@noaa.gov, Richard Eckman)

The division continues its preparations for the WFIP2 deployments in Oregon. Of the three planned sites, FRD is responsible for obtaining a lease and power feed only at the Boardman Airport. The lease for this location has been signed, although there are still some Federal Aviation Administration requirements that must be resolved. FRD will also be installing equipment in Wasco and Prineville, Oregon, but ESRL is responsible for obtaining leases and power at those sites. The deployments at all three sites will be completed in one trip once all the legal hurdles are cleared. Preparation of the hardware that will be deployed is largely complete. (Kirk.Clawson@noaa.gov, Richard Eckman)

ARL Convective Initiation Project

Michael Buban started his postdoctoral work at ATDD during the quarter. Both ATDD and FRD are collaborating in supervising his activities. Michael has experience running Large Eddy Simulations (LES) of the planetary boundary layer and has made that an area of focus for the project. He is using LES to look at the effect of variations in surface properties on convective initiation. The simulations are being done on the NOAA Zeus computer. The project currently has about 7,000 core hours per month on this computer for the simulations. So far, the LES work has mainly focused on horizontal variations in the surface sensible and latent heat fluxes. (Richard.Eckman@noaa.gov)

HYRad

The new user interface for creating multiple simultaneous source releases for HYRad has experienced very few problems in testing. That includes the use of proxy isotopes to provide reduced model runtimes. Any problems were easily resolved and it is now operational. Work is in progress for implementing the use of bundled xml output files. This will provide for the visualization of plume animations and give the user improved access to model run information. (Brad.Reese@noaa.gov, D. Finn)

INL Climate Trends

DOE-Idaho requested an analysis of the 65-year temperature and precipitation record at the Central Facilities Area of the Idaho National Laboratory to see if a climate change signal could be determined. Mean, maximum, and minimum statistics of daily air temperatures were examined. A linear regression and analysis of variance were conducted on the resulting annual average data set. The regression analysis showed a slight upward trend in air temperature. The temperature rise was most visible in the maximum air temperature trend line and least visible in the minimum air temperature trend line. The air temperature rise for the average annual maximum daily air temperature was 0.18 degrees F for each decade. However, this rise was not statistically significant at the 95% confidence level.

The analysis of air temperature was further examined in light of the summer (June-August) and winter (December-February) seasons. For the winter season, the air temperature trend was slightly negative for the maximum, average, and minimum daily air temperatures. However, the slopes were not significantly different from zero at the 95% level as determined by the analysis of variance. For the summer season, a steep increase in air temperature was readily apparent. The steepest increase was observed in maximum daily air temperature, followed by average and then minimum daily air temperature. The slopes for the summertime maximum and average daily air temperatures were significantly different from zero at the 95% confidence level, according to the analysis of variance. This indicates that the summer season maximum air temperature rise is statistically significant and increasing at the rate of 0.4 degrees F every decade.

A similar analysis was undertaken for precipitation. Daily precipitation totals were averaged for each year of record. A linear regression and an analysis of variance were performed on the averaged data. The linear regression indicated that precipitation has been declining at the rate of 0.13 inches per decade, which is a rather small decline. However, the analysis of variance indicated that the slope was not significantly different from zero at the 95% confidence level. A separate analysis of seasonal precipitation did not show any difference between the winter and summer seasons.

(Kirk.Clawson@noaa.gov and Jason Rich)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

An inquiry was made from the INL about the use of available meteorological tower information from the existing towers at the INL and surrounding area to site a NuScale reactor. Questions were answered about the type and quality of the NOAA/INL Mesonet data to see if they meet NRC Regulations which would save the contractor from having to install a new meteorological tower(s). The NOAA/INL Mesonet instrumentation and siting standards meets or exceeds most of the NRC Regulations.

(Jason.rich@noaa.gov and Kirk Clawson)

NOAA/INL Mesonet

A manuscript describing the NOAA/INL Mesonet has been finished. The paper was created to inform the research community of the current availability and capabilities of the Mesonet. The location, instrumentation, quality insurance, and quality control of the Mesonet are all briefly discussed. The paper has passed ARL review and has been sent off to the Journal of the Idaho Academy of Science for review and eventual publication. (Jason.Rich@noaa.gov and Roger Carter)

We are continuing the evaluation of radios and data loggers that may be used in a future upgrade of the NOAA/INL mesonet. We sent detailed questionnaires to five companies that sell VHF communication equipment. Three responded in a timely manner. After evaluating their responses, asking for clarification on a few technical points, and talking to some of their customers, we elected to purchase a few radios from one company for testing in the mesonet. These radios have a data transfer speed 3.3 times the speed of our existing Campbell Scientific equipment and they provide full TCP/IP communications. We have requested a new RF frequency authorization that is required for the testing and hope to start testing later this summer. (Roger.Carter@noaa.gov and Shane Beard)

Problems with data uploads to MADIS are continuing. A significant fraction (30-50%) of the NOAA/INL mesonet data uploaded to MADIS is not ingested into their system. The problems began in March 2015 and there has been no apparent improvement. The latest communication from MADIS indicates they will test a solution to one of the problems in July. Other problems have also not been solved. This situation is not acceptable, but the only options are to wait for MADIS to resolve the problems or stop sending the mesonet data for inclusion in MADIS. (Roger.Carter@noaa.gov)

Emergency Operations Center (EOC)

Team C participated in a dress rehearsal for the CFA Drill on April 4, 2015. (Vehicle accident)

Team D participated in a drill at REC on May 18, 2005 which involved a transportation accident.

Team C participated in the CFA Annual Exercise on June 10, 2015. (Vehicle accident)

Team A participated in an AMWTP drill on June 23, 2015. The drill centered on a fire inside a building located at the AMWTP facility. Several HYRAD plume models runs were executed during the drill. Nowcasts and short term weather forecasts were also completed.

INL Hazardous Weather Alert System

The NOAA INL Weather Center issued 12 Hazardous Weather Alerts last quarter. Eight of the alerts were issued for thunderstorms/lightning while the other 4 alerts were issued for high winds.

OTHER ACTIVITIES

Safety

Roger Carter, Shane Beard, Tom Strong and Donna Davis attended classes at the 2015 Safety Fest of the Great Northwest in Pocatello, ID on April 7 – 8. Some of the classes attended were Fall Protection, Cylinder/Gas Handling Safety and Basic Properties of Natural Gas.

Safety training at April's staff meeting involved a video on indoor air quality (www.HouseInvestigation.com) .

Donna Davis participated in the OAR Safety Council conference call on May 21. The call reminded all field divisions to complete the monthly office safety assessment checklist and the quarterly safety inspection checklist. OAR emergency contact information and general safety housekeeping policy was also reviewed.

In May the FRD staff completed the annual office evacuation and shelter in place drill (SIP). The drill included a YouTube video on preparing, reviewing, and practicing SIP drills.

A YouTube video on general guidelines for lawnmower use from Safety Makes Sense was viewed by the staff during the May staff meeting.

During the June staff meeting, employees took tests on Texting while Driving, Parking Challenges, and Reaction Times to encourage safe driving.

Travel

Donna Davis attended the OAR AO Management Conference in Silver Spring, MD April 12-16.

Kirk Clawson traveled to various sites in Washington and Oregon area June 29 – July 1 in preparation for the WFIP2 Project.

Mike Buban from ATDD visited FRD on 14-15 May to discuss plans for the Convective Initiation project.

Training

Kirk Clawson and Donna Davis completed the required Personal Property Management concepts in April.

In May, Donna Davis completed the Purchase Card Refresher course which is an annual requirement for all purchase card holders and approving officials.

All FRD federal employees attended the 2 day pre-retirement seminar on May 5 – 6.

Miscellaneous

In May we were notified that FRD won the 2014 CFC participation award for Idaho agencies in the “Small Agency” size category.

NOAA Real Property along with FRD’s approval renewed the Jumpoff Peak lease for another five years. Lease renewal period is October 1, 2015 thru September 30, 2020.